

CLAIMS

1. A method for modulating an optical radiation, the method comprising the steps
5 of:
 - phase-modulating an optical radiation with a modulation signal, by using a modulator having an extinction ratio, so as to obtain a multi-level phase shift key optical signal including a stream of optical pulses, wherein each of said optical pulses has a respective optical phase value
10 related to said modulation signal;
 characterized in that the method further comprises the step of:
 - applying to each of said optical pulses a phase-shift having an absolute value related to said extinction ratio and a sign related, for each of the optical pulses, to said respective optical phase value.
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2. The method of claim 1 wherein said phase-shift is substantially constant in each of said optical pulses.
3. The method of claim 1 or 2 wherein the absolute value of said phase-shift is
20 equal to or less than about $\pi/10$.
4. The method of any of the previous claims, wherein the absolute value of said phase-shift is determined as a function of said extinction ratio, said function being a decreasing function with increasing extinction ratio.
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5. The method of any of the previous claims, wherein the absolute value of said phase-shift is equal to about $\arctg\left(\frac{1}{ER_{lin}}\right)$, wherein ER_{lin} is the extinction ratio.
- 30 6. The method of any of the previous claims further comprising the steps of:
 - providing a first and a second logical signal (S_1 , S_2) linked with said modulation signal;

- generating a first and a second driving signal (V_1 , V_2) for said modulator from said first and second logical signal;
- establishing said sign as a logical function of said logical signals.

5 7. The method of claim 6 wherein said logical function is equivalent to NOT[XOR(S_1 , S_2)].

10 8. The method according to any of the previous claims, wherein said multilevel phase shift key optical signal is a differential multilevel phase shift key optical signal.

15 9. A method of optical communication comprising transmitting an optical signal at a first location and receiving the optical signal at a second location different from the first location, wherein transmitting comprises modulating the optical signal according to the method of any of the preceding claims.

20 10. An electro-optical apparatus (10) for modulating an optical radiation based on a modulation signal, comprising:

- An optical modulator (20) apt to receiving an optical radiation and generating a multilevel phase shift key optical signal including a stream of optical pulses, each having a respective optical phase value related to said modulation signal, said optical modulator having an extinction ratio and being apt to being driven by a first and a second driving signal (S_1 , S_2); characterized in that the apparatus further comprises
- 25 – a phase-shifter (40) optically connected to the optical modulator, apt to applying to the phase of each optical pulse a phase-shift having an absolute value related to said extinction ratio and a sign depending, for each of the optical pulses, on said respective optical phase value; and
- 30 – a logical circuit (50) apt to generating a third driving signal (S_3) logically related to said first and second driving signals (S_1 , S_2), the logical circuit being logically connected to the phase-shifter for feeding said third driving signal (S_3) to said phase-shifter.

35 11. An apparatus according to claim 10, wherein said third driving signal (S_3) determines said sign of said phase shift.

12. An apparatus according to claims 10 or 11, wherein said optical modulator (20) comprises a dual-drive Mach-Zehnder modulator (60).
- 5 13. The apparatus according to any of claims 10 to 12, wherein said optical modulator is an optical modulator apt to receiving an optical radiation and generating a quadrature phase shift key optical signal.
- 10 14. An optical transmitter comprising an optical source optically coupled to an electro-optical apparatus according to any of claims 10 to 13.
- 15 15. An optical communication system comprising an optical transmitter for transmitting an optical signal, an optical receiver for receiving the optical signal, and an optical communication line connecting the transmitter to the receiver, wherein the transmitter comprises an electro-optical apparatus according to any of claims 10 to 13.